DOCUMENT RESUME

ED 347 991 IR 015 728

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TITLE The Adoption and Diffusion of an Electronic Network for Education.
PUB DATE Feb 92
NOTE 8p.; In: Proceedings of Selected Research and Development Presentations at the Convention of the Association for Educational Communications and Technology and Sponsored by the Research and Theory Division; see IR 025 706.
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Adoption (Ideas); *Attitudes; *Change Agents; College Faculty; *Computer Networks; *Educational Change; Elementary Secondary Education; Higher Education; Information Dissemination; *Information Networks; Student Teachers; Teachers; Telecommunications; Use Studies
IDENTIFIERS *Adoption Diffusion Theory (Rogers)

ABSTRACT

Adoption diffusion theory was used as the theoretical base to study early adopters' use of an electronic communication network for teachers developed at the College of Education at Iowa State University, i.e., the Electronic Educational Exchange (EEE). The EEE is designed to provide a convenient method for the exchange of ideas between student teachers, practicing teachers, and Iowa State faculty, and to provide telecommunications experience for the three groups. Thirty-five subjects were selected from a list of the most frequent EEE users in the spring of 1990, including university professors, graduate students, student teachers, and preservice teachers from Iowa State, and educators from the surrounding area. Research has suggested that personal characteristics early adopters have in common include education level, social status, social participation, cosmopolitan outlook, mass media use, personal communication, degree of innovation information seeking, attitude toward change, attitude toward risk, aspirations, and attitude toward fatalism; the questionnaire used in the study elicited such information from the subjects as well as their initial and current perceptions of the EEE in five categories: relative advantage, compatibility, triability, complexity, and observability. It was found that, in general, the characteristics of early adopters were in agreement with the Adoption/Diffusion Theory of Rogers; the subjects' current perceptions of the system were higher than their initial perceptions; and the message content and persons with whom subjects communicated were similar and suggested that the system was being used for professional development purposes. A discussion of the educational implications of these findings concludes the paper. (5 references) (BBM)

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The Adoption and Diffusion of an Electronic Network for Educators

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Background

The professional isolation of educators has long been a problem. Dan Lortie describes the "egg crate" nature of teaching, referring to the fact that typically, teachers are isolated in their classrooms and have little opportunity for interaction with other teachers and experts in their fields (Lortie,1975). Supporting Lortie's findings, Goodlad (1983) reports that teachers are generally confined to their classrooms and are unable to converse with other educators about problems or concerns.

The capabilities provided by electronic communication networks provide a possible solution for the professional isolation of teachers. Although research suggests electronic communication networks are currently being used effectively by some educators,the diffusion process of such networks has not been widely spread. With the development of electronic communication networks, an adoption/diffusion cycle occurs as potential users become aware of the innovation, judge its relative value, make a decision based on that judgement, implement or reject the innovation, and seek confirmation of the adoption/rejection decision. Electronic communication networks are one of the most recent technologies to begin the diffusion process through the educational system. Research on electronic communication networks is valuable to educators developing and managing networks. More specifically, research determining characteristics of early adopters and how they judge the value of such systems is necessary because this information helps researchers and developers understand and improve use of the innovation. The adoption/diffusion theory (Rogers,1986) provides a framework in which this research can be conducted.

Rogers (1986) stated that the four main elements in the adoption/diffusion process are the innovation, communication channels, time and the social system. Rogers defined an innovation as an idea, practice or object that is perceived as new by an individual. According to Rogers (1986), diffusion is the process by which an innovation makes its way through a society or specific group of people. The process of diffusion includes 3 components: 1) the innovation, 2) an individual or other unit of adoption who knows about or has experience with the innovation, and 3) a communication channel which provides a means of information exchange between the parties. Communication channels include two types: 1) mass communication channels, 2) interpersonal channels.

Diffusion is concerned primarily with the innovation and the adoption of the innovation. Following the introduction of the innovation, an evaluation process takes place on the part of the consumer. Diffusion of an innovation through a social system is determined by characteristics of the adopter and the perceived value of the innovation.

Early adopters have been found to possess common personal characteristics. In past research common characteristics of early adopters have been found in the categories of socioeconomic status, communication behavior, and personality traits. More specifically, research has concluded that personal characteristics early adopters have in common are their:

1. Education Level
2. Social Status
3. Social Participation

4. Cosmopolitan Outlook
5. Mass Media Use
6. Personal Communication
7. Degree of Innovation Information Seeking
8. Attitude Toward Change
9. Attitude Toward Risk
10. Aspirations
11. Attitude Toward Fatalism

One of the important individual differences in length of the innovation-decision period is on the basis of adopter category. Early adopters have a shorter innovation-decision period than later adopters. The first individuals to adopt a new idea (the early adopters) do so not only because they become aware of the innovation somewhat sooner than their peers, but also because they require fewer months and years to move from knowledge to decision (Rogers and Shoemaker, 1971).

Early adopters model change agents. A change agent is a professional who influences innovation-decisions in a direction deemed desirable by a change agency (Rogers and Shoemaker, 1971). Early adopters of innovations play an important role in the diffusion process. Their initiative to adopt an innovation is observable by the later adopters, especially the early majority. This observance by the later adopters influences their adoption and thus the success of the innovation.

The early adopters also serve as a filter for innovations. If the early adopters have a poor perception of an innovation, the innovation will be filtered out of the system but if the early adopters perceive the innovation as worthy they filter the innovation through the social system. Therefore, early adopters initial perceptions of an innovation is an important element in the diffusion process.

According to Rogers (1986), adopters' perceptions of an innovation are also a vital element in the diffusion process. He has concluded that there are five dominant characteristics that adopters use to judge the value of an innovation. These characteristics include:

Relative Advantage - the degree to which an innovation is perceived as being better than the idea it supersedes. The relative advantage of a new idea, as perceived by members of a social system, is positively related to its rate of adoption.
Compatibility - the degree to which an innovation is perceived as being consistent with the existing values, past experiences and needs of the receivers. The compatibility of a new idea, as perceived by members of a social system, is positively related to its rate of adoption.
Triability - the degree to which an innovation may be experimented with on a limited basis. The triability of a new idea, as perceived by members of a social system, is positively related to its rate of adoption.
Complexity - the degree to which an innovation is perceived as being relatively difficult to understand and use. The complexity of a new idea, as perceived by members of a social system, is negatively related to its rate of adoption.
Observability - the degree to which the results of an innovation are visible and easily communicated to others. The observability of a new idea, as perceived by members of a social system, is positively related to its rate of adoption.

The adoption, implementation, and utilization of new communication technologies, such as electronic communication networks, can be studied effectively based on the theoretical framework of the adoption/diffusion theory. Diffusion of an innovation is determined by personal characteristics of adopters in a social system and their perceived value of the innovation. In order for an innovation to be successfully adopted within a social system a diffusion process, the process by which an innovation makes its way through a society or specific group of people, must occur. In this study, adoption diffusion theory was used as the theorectical base to study early adopters use of an electronic communication network for teachers.

The electronic communication network used to conduct this research is entitled the Electronic Educational Exchange (EEE). The college of Education at Iowa State University has developed an electronic network to bridge the gap between the world of

practice in the classroom and education faculty at the university. The EEE is designed to serve the following purposes:

I. Provide a convenient method for the exchange of ideas between student teachers, practicing teachers and Iowa State faculty.

A. Decrease the sense of isolation often encountered by student and practicing teachers.

B. To make faculty expertise readily available to student and practicing teachers.

C. To increase faculty awareness of the problems frequently encountered by student and practicing teachers.

II. Provide telecommunications experience for student teachers, practicing teachers, and Iowa State faculty.

Problem

The manner in which educational institutions are organized generally restricts teachers to their classrooms, which limits interaction with one another. Teacher isolation is currently a major concern within the field of education. Many communication formats such as journals, office memos and school calenders serve as methods of mass communication, but alternative methods that facilitate interpersonal communication must be examined.

Electronic communication networks are relatively new systems that have been proposed as one method to decrease teacher isolation. Although research has begun to indicate that electronic networks seem to be a "natural fit" to meet many needs in the teaching profession, networks haven't been adopted and diffused on a large scale basis. There is a need to collect data on characteristics of early adopters to better understand the people and why they use electronic networks as a communication device. There is also a need to understand the evolution of network use. In order to determine this information a theoretical framework must be implemented. The adoption, diffusion theory provides us with the framework needed in order to evaluate the adopters of electronic networks, their use of the networks and the evolution of electronic communication networks. The data will assist individuals and organizations in the implementation and management of electronic communication networks.

Study Procedures

In order to conduct this study, a list of the most frequent EEE users in the Spring of 1990 was generated. The most frequent or heavy users of the system were defined as early adopters of the innovation.

A total of 35 subjects were selected. The subjects consisted of 4 Iowa State professors, 4 Iowa State graduate students, 4 Iowa State student teachers, 2 Iowa State pre-service teachers, 1 professor outside of the university, and 20 educators from the state of Iowa and surrounding states.

A questionnaire was used in this study. Research has suggested that personal characteristics early adopters have in common are: education level, social status, social participation, cosmopolitian outlook, mass media use, personal communication, degree of innovation information seeking, aspirations and attitude toward change, risk and fatalism. Therefore, the questionnaire was designed to collect data in these areas. In addition, research suggests that perceptions of an innovation directly affect the diffusion process. An additional section of the questionnaire allowed the early adopters to rate their initial and current perceptions of the EEE in five categories. The categories included relative advantage, compatibility, triability, complexity and observability.

Results

In general, the results of the study with respect to characteristics of early adopters were in agreement with Rogers. The average early adopter of the Electronic Educational Exchange can be described as:

1. possessing a Masters Degree or another degree beyond BA
2. having an income of $30,000 or more
3. working as a classroom teachers
4. being approximately 39 years old
5. having 11 or more years in the field of education
6. contacting teachers outside of their school frequently
7. using various forms of media frequently
8. having a positive attitude toward technology
9. having an attitude that risk is necessary in life
10. having a neutral attitude on fatalism

A significant finding in the study involved the initial and current perceptions of the Electronic Educational Exchange. The subjects were asked to rate the EEE, based on 5 categories, using a five point scale ranging from very high to very low. The mean of the initial perception was 2.41 indicating that the users felt the system ranked between average and high. Later, the subjects were asked to rate their current perception of the system. A mean of 1.92 was calculated as the current perception of the system, indicating that the users had a significantly higher perception of the EEE than when they began using the system. Overall, the data suggested that early adopters of the EEE were receiving the services they were seeking from the system. Results are reported in Table 1.

Table 1. Early Adopter's Initial/Current Perceptions of the EEE

Perception	N	Mean	S.D.	T	2-Tailed Probability
Initial Perception	29	2.41	.682	3.31	.001
Current Perception		1.92	.476		

Message content and with whom individuals communicated was also compiled and evaluated. The subjects were asked to comment on "with whom they communicate most frequently" and "what their message content entails". The responses were similar. Teachers, Iowa State faculty, and graduate students were the most common users mentioned as communication partners on the EEE. Media specialists and the system operator were also mentioned.

Message content was also similar among users; content categories included research, teaching ideas, educational technology, classroom management and personal messages. This suggested that the system was being used for professional development purposes by the users.

Educational Implications

Although research suggests electronic communication networks are currently being used effectively by some educators, the diffusion process of such networks has not been widely spread.

Research suggests that early adopters play a vital role in the diffusion process. They serve as a filter for the network. According to Rogers (1986), if the early adopters have a poor perception of an innovation, the innovation will be filtered out of the

system but if the early adopters perceive the innovation as worthy they filter the innovation through the social system. Early adopters of the EEE were asked to report their initial and current perception of the system. The mean of the initial perception was 2.41 indicating that the users felt the system ranked between average and high. Later, the subjects were asked to rate their current perception of the system. A mean of 1.92 was calculated as the current perception of the system, indicating that the users had a significantly higher perception of the EEE than when they began using the system. Overall, the data suggested that early adopters of the EEE were receiving the services they were seeking from the system.

Rogers (1986) stated that early adopters of innovations possess certain characteristics and the present study supports his findings. In general, the study found early adopters of the Electronic Educational Exchange to possess these characteristics described by Rogers. Therefore, it is suggested to network developers that they individually seek individuals possessing characteristics similar to those of the early adopters of the EEE. Their use will increase the system's observability therefore, enhancing the diffusion process.

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